

DOCUMENT RESUME

ED 333 287

CG 023 441

TITLE Texas School Dropout Survey Project. Volume 5: Benefit-Cost Impact of the Dropout Problem.

INSTITUTION Intercultural Development Research Association, San Antonio, Tex.

SPONS AGENCY Texas Education Agency, Austin.; Texas State Dept. of Community Affairs, Austin.

PUB DATE 31 Oct 86

NOTE 51p.; For related documents, see ED 279 752 and CG 023 437-443.

PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.

DESCRIPTORS Black Youth; *Cost Effectiveness; Cultural Differences; *Dropout Prevention; *Dropouts; Employment Potential; Grade 9; Hispanic Americans; Racial Differences; Secondary Education; *Secondary School Students; Sex Differences; Unemployment; Whites

IDENTIFIERS *Texas

ABSTRACT

Volume 5, the fifth of eight publications developed by the Intercultural Development Research Association as part of the "Texas School Dropout Survey Project," describes a study, conducted exclusively in Texas, which replicated national studies on benefits and costs of dropout prevention. The benefits in the study are expressed in terms of the savings in expenditures in relation to welfare, crime, incarceration, unemployment insurance payments, and employment services that might result from the eradication of the dropout problem and the potential gains in earnings and taxes resulting from dropouts having a higher earning potential if they become high school graduates. The costs relate to the expenditures that would be required to complete a high school education, pay for years in college that some might go on to after graduation from high school, and implement dropout prevention efforts. The benefit categories summed to approximately \$17.5 billion while the cost categories summed to approximately \$1.9 billion, suggesting that, for every dollar expended on prevention and the education of the would-be dropout, nine dollars would be returned. The estimated losses in social expenditures related to welfare, crime, incarceration, and unemployment alone amounted to \$652 million, a figure not far from the estimated cost to complete the high school education (\$913.5 million) of all 86,000 estimated dropouts. Eighteen data tables are included. (Author/NB)

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ED333287

CG023441

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VOLUME 5: BENEFIT-COST IMPACT OF THE DROPOUT PROBLEM
INTERCULTURAL DEVELOPMENT RESEARCH ASSOCIATION

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Preface

This volume is one of eight publications developed by the Intercultural Development Research Association as part of the Texas School Dropout Survey Project. Seven volumes contain comprehensive reports for each area of study:

Volume 1: Magnitude of the Problem -- Census Analysis

Volume 2: Magnitude of the Problem -- Attrition Analysis

Volume 3: Magnitude of the Problem -- Tracking Study

Volume 4: Magnitude of the Problem -- School District Research and Procedure

Volume 5: Benefit-Cost Impact of the Dropout Problem

Volume 6: Program Responses -- Their Nature and Effectiveness

Volume 7: Study Methods and Procedures

Additionally, a synopsis of findings and implications across all areas of study is included in the report entitled Texas School Dropout Survey Project: A Summary of Findings.

EXECUTIVE SUMMARY

The current study, which focused exclusively on Texas, replicated national studies of the benefits and costs associated with the prevention of dropouts. The benefits in this study are expressed in terms of: 1) the savings in expenditures in relation to welfare, crime, incarceration, unemployment insurance payments and employment services that might result from the eradication of the dropout problem; and 2) the potential gains in earnings and taxes resulting from dropouts having a higher earning potential if they become high school graduates. The costs relate to the expenditures that would be required to: 1) complete their high school education; 2) pay for the years in college that some might go on to after graduation from high school; and 3) implement dropout prevention efforts.

The benefit categories sum to approximately \$17.5 billion. The cost categories sum to approximately \$1.90 billion. In essence, for every dollar expended on prevention and the education of the would-be dropout, nine dollars will be returned. Also, the estimated losses in social expenditures related to welfare, crime, incarceration and unemployment, alone amounted to \$652 million. This is not far from the amount we estimate it will cost to complete the high school education (\$913.5 million) of all of the 86,000 dropouts we estimated in this study. The question then is: Where do Texans wish to spend limited resources? On the basis of the staggering amount being lost in earnings and tax revenues (i.e., \$16.89 billion), it seems the choice would be obvious. Indeed, it is interesting to consider how long it would take before dropout education and prevention is funded totally by the increased revenues gained by diminishing the dropout problem.

It is estimated that the 86,000 students lost in the graduating class of 1985-86 will result in a potential tax loss of \$5.07 billion over the next forty-five years. In addition, the students that will be lost in the class of 1986-87 will likewise result in a loss in tax revenues of approximately \$5.07 billion over the course of their forty-five years in the labor force. And the pattern continues. Given the extraordinary amount being lost in taxes for each graduating class (\$5.07 billion), it would not be long before the \$332 million we estimated might be required for the prevention efforts could be funded totally from the increased tax revenues paid by the averted dropouts.

INTRODUCTION

It is implicit in most of the literature related to dropouts that "dropping out" is detrimental to both the individual and society. Popular conceptions abound relating dropouts to increased crime, lower wages, higher unemployment, and diminished life satisfaction to name but a few. Additionally, many argue that as employers focus greater attention on higher levels of educational achievement, the economic penalty paid by dropouts will become even more severe. Society is also said to suffer both directly and indirectly in lost productivity, a diminished tax base, greater vulnerability to foreign competition, and greater general dissatisfaction in the population. There is an abundance of data reporting that in areas where less money is spent on education dropout rates are higher (Levin, 1972). Additionally it has been shown that educational practices affect the probability of dropping out. If a student is retained in one grade, his/her chance of dropping out increases by 40-50 percent (Mann, 1986). Dropouts tend to have less developed reading and verbal skills. Based upon what has been demonstrated within the evaluation of an early childhood intervention program, even the most disadvantaged among us do not have to exist within these distressing educational conditions (Barnett, 1985). Yet to prevent or remediate such conditions, substantial financial resources must be allocated. The prevention of dropouts would at minimum require two major areas of expenditures: (a) the public education costs required to continue their education past the point at which they would have dropped out, and (b) the cost of implementing effective dropout prevention programs. This latter expense is based on the assumption that the current educational system has failed to retain these students and hence an alternative set of programs is required to effect prevention.

The allocation of resources by society to dropout prevention programs is an investment in individual students with an implicit assumption that there will be a positive return to society as a whole. The use of benefit-cost analysis as employed in this study represents an effort to test this assumption. Through this analysis both the costs and associated benefits will be quantified and compared.

Benefit-cost analysis within the context of social policy essentially seeks to help society optimize return on capital. Specifically, will society in general realize a fiscal benefit by providing effective education to those within society who are currently early leavers of the formal education system?

Benefit-cost analysis is commonly used in business to evaluate the relative merits of competing methods such as between various manufacturing alternatives. The analysis carried out to evaluate the drop-out question must be stated in such a way that two alternatives can be compared. There are currently costs associated with dropouts. Dropouts do use educational services even though their programs are prematurely aborted. Dropouts also tend to utilize various human services in disproportionate numbers. Further dropouts are represented in the criminal justice system at a higher percentage than the population as a whole. Dropouts also appear to be employed at a higher rate in low income jobs. Their overrepresentation in low income jobs not only diminishes their potential lifetime earnings but also reduces the overall federal, state and local tax bases (Levin, 1972; Catterall, 1985). The preceding litany serves as only a partial list of costs incurred by society due to dropouts. Certainly not all these costs may be validly linked to limited education. However, if effective education were provided those among us who leave public education before completion, thereby ameliorating the dropout problem, these costs might not be incurred by society at such a high level.

As stated earlier, the provision of effective education to those who otherwise would have dropped out will also involve costs. Therefore, the central question becomes -- *are there quantifiable benefits associated with dropout prevention which are greater than the associated costs?*

Phenomena such as poverty and incarceration have quantifiable costs to society associated with them. However, not all the costs in these or similar areas lend themselves to quantification. Poor self image is associated with dropouts. How can this cost be evaluated? Poor self image may manifest itself in some way that can be measureable in economic terms yet by itself it remains unmeasurable. The inability to quantify some aspects of both the costs and benefits becomes a basic limitation of any benefit-cost model. Those costs and benefits which can be established but which cannot be quantified in economic terms will not be directly considered in the calculations associated with the model. However, these unquantifiable areas will be discussed where possible to provide the reader access to the results a benefit-cost model can offer without oversimplifying the phenomena and issues under study.

Another aspect of benefit-cost analysis to consider is the utilization of an investment criterion. Specifically, an investment criterion seeks to reduce the lack of equivalence between money expended in the present and the return received in the future. Future returns on investments are often discounted by some percentage to provide for equivalence. This discount is employed because of the assumption that in the collective mind of society, currently available money is of more value than money received in the future (Barnett, 1985). The argument typically goes that if an individual invests \$1.00 for a year he might expect to receive, for example \$1.05 at the end of this period. If an alternative is offered wherein he might earn a higher interest rate such that his investment would yield \$1.07, he would probably choose this alternative over the former. In any event, he is expected to rarely if ever invest current money without some expected rate of return.

The choice of the discount rate is a very complex matter in that there is no single rate valued over all others and investments differ in their expected rates of return. In Levin's 1972 benefit-cost analysis on the impacts of dropping out, he chose not to discount benefits since a commensurate level of productivity was not also factored into the benefit-cost equation. In discussing the issue of lost wages in his model, Levin asserted that "...by not adjusting future income upward for increases in labor productivity, we have tacitly assumed a discount rate of about 3 percent" (p. 23). Levin assumed that increases in productivity of 3 percent would, for all practical purposes, negate the need to employ a 3 percent discount rate. One would simply cancel out the other. While some would argue that the implicit discount rate of 3 percent used by Levin in 1972 is low by present day interest rate standards, there is a valid argument for retaining his general approach to the issue. Whereas current interest rates are higher so to are the possibilities for increases in labor productivity brought about by rapid increases in high technology. Given the potential for rapid increases in productivity that our society may experience in the coming decade this study will assume, as did Levin, that not adjusting for productivity will negate the necessity to adjust for the discount rate.

Beyond the difficulties in choosing a discount rate and ascribing values and measuring benefits, there is also the issue of causality. One study concluded that the primary concern should not be focused on the act of dropping out but rather on the antecedents that precipitated this action (Bachman, Green & Wirtanen, 1972). They argue that the lower income levels and higher unemployment rates found among dropouts are not a func-

tion of the lack of educational attainment but rather symptoms of the same difficulties that led to their lack of educational attainment. Indeed, the causal relationships in the act of dropping out are far from understood.

Yet another major difficulty is found in the fact that many of the variables under analysis are intercorrelated to such a great extent that it is difficult to be certain how much of an influence either variable alone is contributing to the overall effect under study. Once an individual has dropped out, how much of the negative consequences he or she encounters are a function of dropping out? A number of studies have documented that parents' level of education was found to be an excellent predictor of dropping out. However, one might hypothesize that the finding was a function of the fact that parents with less education also have less income. Indeed, studies have noted a direct relationship between socio-economic level and dropping out. Another example revolves around the popular belief that dropouts have a higher probability of ending up in prison than do nondropouts. However, if the dropout rate is higher among lower socioeconomic groups and the representation in the criminal justice system is higher among the lower SES groups was it the act of dropping out or their background of poverty that increased their chances of being found in prison? Doubtless, it is not an either or proposition but rather a question of how much each factor contributed to the increased probability. One method of circumventing this difficulty involves longitudinally tracking a large group of students over time and maintaining data on the group across a range of dimensions.

The longitudinal tracking design affords the possibility of partially measuring the relative influence of different factors on the consequences of dropping out. Typically in such studies the relatively large database held on the students being tracked allows the researchers to statistically examine their theoretical arguments. Hence the statistical significance of the primary variable (i.e., educational achievement) as a predictor of a particular negative consequence, such as a greater probability of being found in prison, can be measured while holding interrelated variables (such as poverty, IQ, family background, etc.) constant. Although such approaches appear more elegant in design, they often result in findings that are far from elegant. The results generally indicate that it is a unique combination of factors that contribute to a particular phenomenon, such as being found in prison, and that simple lines of causality are not possible.

Despite its shortcomings the longitudinal tracking approach is probably the best of the designs available in this area. The difficulties associated with the longitudinal tracking approach generally involve time and costs. Clearly a great deal of time must pass before the findings can be gathered and examined. In a society like our own, where changes occur at a rapid rate, this means that the findings may be dated by the time they are available. This is particularly true in an area related to education and the job market. Given the monumental changes to our society caused by moving from an industrial to an information processing society, it is difficult to use 1980 data to predict or study the needs an individual or society will have in the 1990s. Finally, the issue of the costs associated with conducting a research study are often prohibitive when employing the longitudinal design.

Another design approach is the application of an after-only benefit-cost model on a population that was self selected in the past. An example of this is a study by Levin (1972). Levin's study represents one of the major works in the area of estimating the costs to society of dropouts. Levin generated national cost estimates by using information on dropouts and non-dropouts and projecting the impact over time. In such studies, self-selection is obviously in place. However, this approach has a number of advantages over

the longitudinal technique. First, it recognizes that at best only estimates can be generated. While doubtless appearing less elegant in a research sense, it may be far more true to the actual conditions of reality. It is of limited value to assert what might have happened if all factors were held constant, when nature and society will rarely if ever provide such conditions. Second, it can be conducted in a much shorter time frame and the model produced can be applied quickly to the social policy decisions under consideration.

Both the longitudinal and after-only designs generate models that can be tested in the real world. Indeed, the approach that may be most sound is to generate estimates of costs and benefits on the basis of a variety of alternative approaches, similar to high and low estimates Levin (1972) discussed in his study. Whatever designs are applied, one must first examine what might be the costs and benefits to be tested.

COST AND BENEFIT CATEGORIES

As has been mentioned earlier, not only is it difficult to quantify cost, it is equally difficult to categorize what will be considered the costs and benefits. In relation to both costs and benefits, there are three major categories: direct, indirect and intangible. A direct benefit of an individual having a more complete education may for example be an increased ability to earn money. This is a direct benefit to the individual in the form of increased wages and a direct benefit to society in the form of an increase in the taxes paid by this person. An indirect benefit might be the generally positive effects an improved standard of living can bring to the individual's family. An intangible benefit might be the increased self esteem the individual would feel and the impacts this would have on this person's mental and physical health. The separation between these categories is often not quite as clear. It is also important to consider the vast complexities surrounding each of these costs and benefits so that even if one cannot quantify some of these factors, and hence include them in the model, they can at minimum be considered in the interpretation of the results of the model.

Many of the costs and benefits to be discussed have implications for both the individual and society. If, for example, an individual has a higher probability of being found in prison if he or she is a dropout, this represents a cost to both the individual and society. The individual pays with time, lost wages, psychological and physical pain as does the family of this person. Society pays directly through the costs of its judicial and correctional system, and indirectly in the loss of contributions this individual could have contributed to the overall society. To avoid this situation is also a benefit for both the individual and society. The absence or curtailment of many of the costs to be detailed herein can be considered direct benefits. It might be best to move from those benefits that are most directly tied to the individual to those that are most focused on society. Keeping in mind that this artificial distinction is purely for purposes of facilitating the discussion.

PSYCHOLOGICAL AND PHYSICAL PAIN

Psychological literature contains a great many studies demonstrating the positive benefit to the individual of having options in life. Indeed, much of the literature related to hopelessness refers to the psychological experiences of those who consider themselves without such options. The literature related to dropouts indicates that one of the negative impacts of dropping out is the limitation this act may place on the individual. The stu-

dent who drops out is said to: (a) increase his or her probability of unemployment; (b) decrease the range of jobs for which he or she is qualified; (c) increase his or her probability of earning lower wages, if employed (which initiates a number of concurrent negative effects associated with lower socio-economic levels); and (d) increase the chances of ending up in what many term "dead end jobs". Each of these results has the effect of decreasing the potential options available to the individual and possibly to his or her family. The negative impact of this on the individual is difficult to quantify with any degree of accuracy. However, it may act as a precursor to other negative impacts that are more easily measured.

The relationship between crime and dropping out is often based on the notion that many individuals with limited options might turn to crime when unable to succeed in legal settings. Drug and alcohol abuse are many times linked to the sensation of hopelessness in the abuser. Violence is also cited as a possible result of a prolonged sense of hopelessness. Clearly, each of the phenomenon of crime, substance abuse, and violence may often occur for reasons unrelated to hopelessness. However, the reader must consider how often the concept of hopelessness may have been a major factor. It is in these cases that negative costs might have been avoided. Education is but one means of increasing an individual's options and hence the question is how many of the subset of cases related to hopelessness might have been avoided as a function of using education to increase the individual's options. Even assuming for the moment that this is only a subset of the total number of cases, how will we ascribe a value to what was lost or suffered in these cases?

In part, a cost can be ascribed. We can, for example, estimate the costs paid by the judicial, correctional, and social welfare systems to serve the subset of individuals who, for want of an adequate education, found themselves with too few options in life. We can also estimate the services rendered to this person's family that might have been avoided. We can estimate the increase in potential positive contributions these individuals might have provided society had they had an adequate education. In essence, such estimates are the best information which benefit-cost analysis can provide in this context.

LOST WAGES AND TAX REVENUES

In Levin's 1972 study and in Catterall's 1985 replication, the concept of lost wages played a pivotal role in their cost estimates. Both researchers cited evidence that dropouts, on average, earn lower wages than their counterparts who graduated. In addition, both indicated that, over the course of an average lifetime of earnings, this differential in earning power would result in substantial losses in wages and tax revenues. Indeed, Catterall (1985) chose to concentrate the majority of his efforts in estimating the impact of these losses in comparison to the cost of education. Given the fact that these studies were conducted over a decade apart it is not unexpected that the actual dollar figures they quoted are substantially different. Nonetheless, both indicated results that support the conclusion that the costs in lost wages and tax revenues alone could serve as adequate justification for the benefit of providing a complete education to the pool of would-be dropouts.

The present study will replicate the work of Levin (1972) and Catterall (1985) to arrive at an estimate of the impact of lost wages and tax revenues to Texas as a function of the dropout problem. The estimates generated will be verified against Catterall's recent estimates for the nation. Once the amount of lost wages is estimated, an additional estimate will be developed relating to the lost federal, state and local tax revenues that

would accompany the loss in wages.

THE IMPACT ON SOCIAL PROGRAMS

Virtually all human service programs exist in a climate of capital rationing in that not all of those who need services can actually be provided services. The literature on human service organizations contains many pleas for the implementation of primary prevention techniques in hopes of stretching the limited resources available for social programs. Hence, it is anticipated that if a given percentage of clients could be prevented from requiring the services of these social agencies through the provision of a more adequate education, they would simply be replaced by other clients in the community that needed help but would not have received it. If this is the case there would be two levels of benefit associated with the prevention of selected cases through the provision of a more adequate education: (a) the savings in the services that would have been provided to these individuals and (b) the fulfillment of a portion of the "unmet need" in the community that could not have been served had the resources been used on the dropouts.

Among the various human service programs we will concentrate on three major areas: (a) welfare costs; (b) unemployment costs; (c) job training and Adult Basic Education costs. For example, in determining welfare costs, the focus will involve an analysis and estimate of the impact that a lower incidence of dropouts might have on the services provided by the Department of Human Services. In assessing unemployment costs, the study will examine the service expenditures of the Texas Employment Commission. In relation to job training, a number of publicly funded training programs have been established to assist individuals who are inadequately prepared for the job market. Many of the users of these programs are dropouts. Hence, we might infer that had an adequate education been provided, they might not require the assistance of the training programs. It should be noted that we will not however attempt to estimate the considerable costs private industry expends on the training of insufficiently educated workers. In addition to job training, a portion of the costs associated with Adult Basic Education will be included as a cost in our model on the basis that some portion of these services would not be required if everyone had and does graduate from high school. Before discussing each of these areas, the estimation model will be described in a hypothetical sense to allow the reader an opportunity to examine its structure. Figure 1 will serve as a reference point for the discussion to follow.

Let us assume that we have a social program that serves 100 people every year and that a total of 1000 people live in the community. Our first step will be to examine the percentage of dropouts found in the community as a whole and in the subset of 100 social program users. Let us further assume that upon examination we find in step two the percentages to be as follows: 20 percent dropouts in the total population and 75 percent dropouts in the social service user population. Step three simply applies the percentages to the two groups and determines that 200 of the 1000 individuals in the overall population are dropouts and 75 of the users are dropouts. Since the users are a subset of the total, in step four we note that 75 of the 200 dropouts in the overall community showed up as users whereas 25 of the 800 non-dropouts were found to be users of our hypothetical service. In step five, we simply convert these proportions to rates per 100 in order to compare the incidence of being a user in the dropout vs. the non-dropout group. We find that the dropouts are using the service at a rate of 37.5 per 100 in contrast with the 3.1 per 100 rate shown for non-dropouts.

FIGURE 1
COST ESTIMATION MODEL

Step 1:

1000 people in the
general population

&

100 people in the
service population

Step 2:

estimate %
dropouts ---

20% dropouts

80% non-dropouts

75% dropouts

25% non-dropouts

Step 3:

apply %

200 dropouts

800 non-dropouts

75 dropouts

25 non-dropouts

Step 4:

users to
population

75 dropouts
used

25 non-dropouts
used

Step 5:

convert to rate

37.5/100

3.1/100

Step 6:

assume non-drop
rate of 3.1/100

6.2 users

25 users

Compare 6.2 to the figure in
Step 3 (i.e. users) to the original
figure of 75

Result = 69 less users or 69 percent savings in expenditures.

Adjustment of inaccuracy of relationship

Step 7:

recalculate with
new rate for
only half the
dropouts

200 dropouts

100 new rate
(3.1/100)

100 old rate
(37.5/100)

800 non-dropouts

original rate
(3.1/100)

3.1 users

37.5 users

25 users

New projected total users = 65.6 vs. 100 or approximately 34% less

Final result of the model is an estimate of 34 percent savings in expenditures.

In critical step six, we conjecture how many of the 200 people in the community that were dropouts would have shown up for service had they had the same rate of usage as their non-dropout counterparts. If the rate of 3.1 per 100 were ascribed to the 200 dropouts, we would expect to still see 6.2 individuals in the service users from the original 200. Note that 6.2 vs. 75 persons would have shown up for service. Or rather 69 of the original 100 service users might not have shown up for service. Those 69 users might be taken to represent 69 percent of the expenditures involved in the service activity given that 100 persons were served. Hence, sixty-nine percent of the costs associated with this service activity might have been saved had the dropouts shown the same rate of usage as the non-dropouts.

Such a model assumes that there is a direct relationship between being a dropout and being a user of the service agency. Clearly, a perfect relationship is not in evidence or we would not have expected the original 800 non-dropouts to yield 25 users. Nonetheless, a level of relationship is in evidence given the disproportionate representation of dropouts in the user group. Let us for the sake of argument assume that in only 50 percent of the cases would converting the 200 dropouts in the community to non-dropouts would they actually inherit the non-dropout rate of usage. Hence, for 100 of the original dropouts the increase in education would not effect their rate of service use. However in the remaining 100 the new rate of 3.1 per 100 would be in evidence. In step seven, we note that such an adjustment would cause a decrease to 34 less persons rather than the 69 noted in step six. In essence, we have cut our original estimate of the service expenditures related to dropouts in half to adjust for our inability to isolate the exact magnitude of the relationship that exists between these two phenomenon. Given the extreme overrepresentation of dropouts in the service users, this adjustment may result in an overly conservative estimate. Nonetheless, this example of the implementation of our estimation model would result in an anticipated savings of 34 percent in the expenditures of our hypothetical service activity. This estimation model will be employed in the majority of cases in generating the estimates for each of the various service activities to be considered.

CRIME AND PUNISHMENT

As stated earlier, some of the literature indicates that individuals with less options, such as dropouts, will have a higher probability of turning to crime. Although the accuracy of this relationship remains in question, it is the case that the majority of individuals in our society's correctional institutions have low levels of education. For example, in the Texas Correctional System, the average educational level of the prisoners is between 6 and 7 years when they entered the system (Texas Department of Corrections, Annual Report, 1981). In order to estimate the relationship and concurrent costs of crime and incarceration associated with many individuals dropping out and not receiving an adequate education there are a number of areas that must be considered. Beyond what society spends on prisons, there are three additional cost areas we will consider which include: (a) the facilities that serve delinquent youth such as Juvenile Probation and the Texas Youth Commission (TYC); (b) the prevention of crime and the apprehension of criminals generally expended by law enforcement agencies; and (c) the judicial system. To not appear esoteric, we will not consider the cost to society associated with the climate of fear and distrust that generally accompanies crime. In considering the relationship between dropouts and crime, then, we have four primary costs areas to estimate: (1) the cost of incarceration; (2) the facilities that serve delinquent youth such as Juvenile Probation and the Texas Youth Commission (TYC); (3) the prevention of crime and the apprehension of criminals generally expended by law enforcement agencies; and (4) the judicial system.

First, we will consider the costs associated with incarcerating individuals that for want of a better education might not have entered the prison system. Clearly, only in some cases would a more effective education have prevented individuals from entering crime and subsequently prison. The question is in what percentage of the cases would it have worked. To generate this estimate, we will need to examine the Texas prison population in detail. As noted earlier, it is anticipated that a high percentage of prisoners had not completed high school upon their entry into the prison system.

The methodology to be employed in generating our estimates of costs will involve the estimation technique discussed earlier that will simulate what might have occurred had a given percentage of dropouts stayed in school and then presumably had inherited the same probability of being incarcerated as the non-dropout population.

Among children and youth the relationship between education and delinquency has been documented in a number of studies (Levin, 1972, Palmore, 1963). A study conducted by Palmore (1963) found that among youth in a large city, dropping out doubled the probability of delinquency. A study by Spiegelman (1967) noted that even when alternative explanatory factors that coincide with education were accounted for (such as race, family size, income, IQ scores and presence of both parents in the home) high school dropouts were three to five times more likely than graduates to be arrested for committing a juvenile crime.

In relation to areas three and four (ie. the prevention of crime and the apprehension of criminals and the judicial system), Levin's (1972) estimation approach will be employed. Levin estimated the costs of: (a) crimes against persons and property, (b) the cost of law enforcement and the judicial system; (c) the foregone income of the inmates; and (d) private costs associated with crime. After having compiled an estimated total cost figure of approximately 8.2 billion dollars Levin states, "Unfortunately our present state of knowledge does not enable us to know the exact proportion of this amount that is attributable to insufficient education per se. Thus, any specific guideline must be an arbitrary one". Levin then asserts that an upper limit of fifty percent (or 4 billion dollars) and a lower limit of twenty-five percent (or 2 billion dollars) might be used with the midpoint of three billion dollars being the best estimate. While such an approach appears at best an informed guess, Levin's approach will be used herein to calculate the costs where no form of education data are available. These areas include the costs associated with: prevention, apprehension and the judicial system. To estimate the costs of the prevention and apprehension systems we must combine the costs of the major State law enforcement agencies in Texas including local police departments, the highway patrol, and sheriff departments. Methods for estimating these expenditures will include an analysis of the operating budgets of these agencies and the estimates they generate on the costs of crime in their communities. A similar approach will be utilized in considering the costs associated with the judicial system.

LOST INCOME AND TAXES

In both the 1972 study by Levin and the 1985 study by Catterall, the issue of lost earnings and the consequent losses in taxes was the primary economic cost incurred as a result of the dropout problem. Numerous census reports have documented the lower annual wages earned by dropouts as compared to individuals that complete four years of high school (U.S. Department of Commerce, Bureau of the Census, 1981). However, the central

question is how much less over the course of a lifetime will the average dropout earn in comparison to an individual who graduates from high school?

Levin (1972) addressed this question by comparing the lifetime earnings of men age 18 and over with different levels of educational attainment. Levin noted, "the difference in expected lifetime incomes between men with 8 years of schooling and those with high school completion is about \$73,000 for the overall population; and differences in lifetime income between high school dropouts and graduates are in the \$40,000-\$50,000 range"(p. 24). Levin calculated the national income loss for the cohort of 25 to 34 year old men he was using for his study. Levin also assumed that a small portion of the would be graduates would continue on to college and that these individuals would earn even greater income. The result of Levin's calculations was a gross income loss of 316 billion dollars over the lifetime of this group of men. Levin further adjusted this figure downward by twenty-five percent to account for a possible "ability factor". Before proceeding it is important to review this issue of an ability factor as presented by Levin.

Levin (1972) indicated that it was reasonable to assume that part of the differences in income noted between persons was a function of ability and not schooling. Levin states: "...individuals with higher educational attainments may possess greater intellectual skills, motivation, and other attributes that enable them to go farther in school and that also increase their productivity in the marketplace"(p. 20). In essence, Levin was asserting that simply causing all the dropouts in his sample to complete their education might not assure them the same level of income as found among those individuals that had completed education on their own. Hence, he attributed three-fourths of the income differences to education and one-fourth to differences in ability. Levin defended this level of adjustment by indicating that a 25 percent correction for ability was within the proper range of ability effects implied by the literature and that ability appeared to be a more prominent factor in explaining income differences at the relatively high levels of educational attainment (such as college) as opposed to the lower levels. The correction for ability is also of importance in that Catterall (1985) proposed a similar adjustment after citing Levin's (1972) work. The current study will also employ this estimate to adjust for the ability factor.

After adjusting the original figure of \$316 billion by twenty-five percent, Levin arrived at the final cost in lost income of \$237 billion. This figure represented \$157.5 billion that came from the additional high school completions and \$79.5 billion that would have resulted from a small percentage of the would be graduates that continued on to college and hence earned even greater levels of income.

Catterall (1985) employed a somewhat different approach to generate an estimate of lost income resulting from dropouts not completing their education. Catterall used the lifetime earnings estimates generated by the Census Bureau (Department of Commerce, Bureau of the Census, 1979) to determine how much less a dropout would earn as opposed to a high school graduate that did not go on to college. This allowed him to improve on Levin's work in that the Census Bureau also generated estimates for women. In Levin's study the lost wages represented only those lost by men. In addition, the figures reported in the Lifetime Earnings Estimates for Men and Women in the United States: 1979 (Department of Commerce, Bureau of the Census, 1979) are more representative of current economic conditions. The report indicates that a man with less than 12 years of education can expect, from age 18 to 65, lifetime earnings of \$601,000., while a high school graduate can anticipate earnings of \$861,000. This represents a \$260,000 dollar difference. Likewise, a woman with less than 12 years of education is estimated to earn \$211,000. as

opposed to \$381,000. for a woman with a high school diploma. The difference for women is therefore \$170,000. The figures from the census report are shown below:

Table 1
Expected Lifetime Earnings in Thousands of 1981 Dollars

<u>Age & Sex</u>	Less than <u>12 yr.</u>	High School <u>4 yr.</u>	-----College-----		
			<u>1-3 yr.</u>	<u>4 yr.</u>	<u>5 yr.</u>
Male (all persons) 18 to 65	\$601	\$861	\$957	\$1,190	\$1,301
Female (all persons) 18 to 65	\$211	\$381	\$460	\$ 523	\$ 699

Catterall (1985) used these income differential figures to estimate the lost earnings of dropouts. Catterall also employed two of the adjustments proposed by Levin prior to arriving at his final figures. These adjustments included: (1) the 25 percent downward correction for the ability factor and (2) a subsequent 36 percent upward correction to account for the additional income to be earned by the would be graduates that would continue on to college and therefore earn even more money. Having completed the adjustments, Catterall approximated the income lost to be \$266,000 for a male dropout and \$199,000 for a female dropout. He then projected the total earnings loss for the high school class of 1981 due to dropping out. To generate his final estimates, Catterall utilized the figures in the table below:

Table 2
Projected Total Earnings Loss to Society
For the High School Class of 1981 Due to
Dropping Out of School

<u>Gender</u>	<u>Enrollment at Grade 8</u>	<u>Individual Lost Earnings Total Lost</u>		
		<u>Dropouts</u>	<u>(Adj.)</u>	<u>Earnings</u>
Male	1.9 million	513,000	\$266,000	\$136.5 billion
Female	2.0 million	460,000	\$199,000	\$91.5 billion
		Total: \$228.0 billion		
Approximate loss of tax revenues:		\$68.4 billion		

The above is a reproduction of Catterall's (1985) Table 2.

Note that as was the case in Levin's study, Catterall also generated an estimate of the lost tax revenues that would accompany the lost income. Catterall used an estimate of 30 percent of income to generate the figure for lost tax revenues. This percentage had been cited and used by Levin in 1972. Catterall asserted that it was still an appropriate es-

timate for 1981 by noting that the percentage of GNP collected in taxes by all levels of government was approximately 28 percent in 1982. The discussion of the Levin (1972) and Catterall (1985) studies was presented to illustrate the precedents for the approach to be employed in the present study's estimates for Texas. The method to be employed herein regarding the estimates of lost wages will closely resemble those presented by Catterall (1985).

Estimate of Lost Wages and Taxes for Texas School Dropouts

As noted in the discussion of Catterall (1985) the Census Bureau developed estimates of the lifetime earnings of men and women by various levels of educational attainment. Before using these estimates for purposes of the current Texas study, we must determine how closely national income figures derived from the Census parallel those of Texas. To accomplish this, two annual wage estimates for the United States and Texas were compared. Table 3 on the following page presents data from the 1980 Census regarding mean and median annual wage estimates by educational categories for Texas and for the United States as a whole.

Table 3
Comparison of Wage Estimates for Texas and the United States

Medians for Males 18 Years Old and Over

	<u>Total</u>	-----Elementary-----		----High School----		-----College-----	
		0-7 <u>Years</u>	8 <u>Years</u>	1-3 <u>Years</u>	4 <u>Years</u>	1-3 <u>Years</u>	4 <u>Years</u>
Tx	\$12,649	\$6,606	\$8,721	\$9,591	\$12,944	\$14,470	\$20,628
U.S.	\$12,686	\$6,438	\$8,521	\$9,686	\$13,149	\$13,724	\$19,224
Difference							
Tx/US	-0.3%	+2.5%	+2.3%	-1.0%	-1.5%	+5.1%	+6.8%

Means for Males 18 Years Old and Over

	<u>Total</u>	-----Elementary-----		----High School----		-----College-----	
		0-7 <u>Years</u>	8 <u>Years</u>	1-3 <u>Years</u>	4 <u>Years</u>	1-3 <u>Years</u>	4 <u>Years</u>
Tx	\$16,135	\$8,774	\$11,173	\$12,016	\$14,878	\$16,827	\$25,857
U.S.	\$15,663	\$8,635	\$10,856	\$11,693	\$14,792	\$15,886	\$23,561
Difference							
Tx/US	+2.9%	+1.6%	+2.8%	+2.7%	+6%	+5.6%	+8.9%

Comparison of Wage Estimates for Texas and the United States

Medians for Females 18 Years Old and Over

	<u>Total</u>	-----Elementary-----		----High School----		-----College-----	
		0-7 <u>Years</u>	8 <u>Years</u>	1-3 <u>Years</u>	4 <u>Years</u>	1-3 <u>Years</u>	4 <u>Years</u>
Tx	\$5,518	\$2,726	\$3,294	\$3,917	\$6,314	\$6,819	\$9,920
U.S.	\$5,514	\$3,195	\$3,666	\$4,183	\$6,085	\$6,511	\$9,296
Difference							
Tx/US	0%	-14.7%	-10.1%	-6.4%	+3.8%	+4.7%	+6.7%

Means for Females 18 Years Old and Over

	<u>Total</u>	-----Elementary-----		----High School----		-----College-----	
		0-7 <u>Years</u>	8 <u>Years</u>	1-3 <u>Years</u>	4 <u>Years</u>	1-3 <u>Years</u>	4 <u>Years</u>
Tx	\$7,040	\$3,760	\$4,518	\$5,337	\$7,105	\$8,098	\$10,557
U.S.	\$7,126	\$4,198	\$4,795	\$5,454	\$7,083	\$7,825	\$10,231
Difference							
Tx/US	-1.2%	-10.4%	-5.8%	-2.1%	+3%	+3.5%	+3.2%

The results of the above comparisons indicate that the data for men are virtually identical for Texas and the United States as a whole. If one compares the medians for males in the educational categories of 1-3 years of high school and 4 years of high school, then a slight difference of -1 to -1.5 percent is noted for Texas. However, the mean for the total indicates virtually identical figures for Texas and the U.S. in these two educational categories. Nonetheless, we will use the conservative approach of adjusting the final lost income figures for men downward by 1.5 percent (the largest of the two median differences in the primary educational categories) to reflect the difference between U.S. vs. Texas income figures.

The data for women in the above comparisons are even more interesting. If one compares the medians for females in the educational categories of 1-3 years of high school and 4 years of high school, the differences are -6.4 to +3.8 percent respectively with Texas showing lower incomes in the lower educational category. The comparison of the means for Texas and the United States further confirm this relationship with a -2.1 and a +3.3 percent difference respectively for the educational categories of 1-3 years of high school and 4 years of high school. These data would seem to indicate that the difference in earnings for women with less than 4 years in high school compared to women with a high school degree are even more pronounced in Texas than in the country as a whole. Women in Texas appear to make less money in the lower educational categories but slightly more money in the higher education categories. We will adjust the final lost income figures for females downward by 6.4 percent (the largest of the mean and median differences noted in the primary educational categories) to reflect the difference between U.S. and Texas income figures.

Having addressed the issue of how Texas income data compared to that of the country as a whole, we can now return to the central question at hand that of projecting lost earnings and tax revenues resulting from Texas dropouts. Recall, that the Census Bureau report estimated that a man with less than 12 years of education can expect, from age 18 to 65, \$260,000 less in lifetime earnings than a high school graduate. Likewise, a woman with less than 12 years of education is estimated to earn \$170,000 less than a woman with a high school diploma. As stated above, we will adjust these figures downward for Texas by 1.5 percent for men and 6.4 percent for women. Hence, the differential lifetime earnings estimates to be utilized for Texas are \$256,100 for men and \$159,120 for women.

However, as discussed earlier, two additional adjustments are required. First, the earnings estimates must be reduced by 25 percent to adjust for the ability factor cited by both Levin (1972) and Catterall (1985). This adjustment decreases the figures to \$192,075 for men and \$119,340 for women. Again, following the approaches of Levin (1972) and Catterall (1985), the second suggested adjustment involves an increase of the earnings estimates by 36 percent to reflect the additional income that will be earned by those would be dropouts that not only complete high school but continue on to college. Before making this adjustment let us consider its validity by examining the Census Bureau data on estimated lifetime earnings and considering some crude estimates of continuation to college. The data presented in Table 3 indicate that beyond the additional \$260,000 a man with four years of high school could expect to earn over a dropout, a man attending college could expect anywhere from 96,000. to \$440,000. more in his lifetime. The amount depends on the length of time in college. Using the figures from Table 3 and some hypothetical continuation rates, the following estimates are generated.

Table 4

Assume 1000 Would-be Male Dropouts
Earnings expressed in 1000s

	700 terminate at high school <u>completion</u>	300 (or 30%) continue to College 50% stay <u>1- 3 yrs.</u>	40% stay <u>4 yrs.</u>	10% stay <u>5 or more yrs.</u>
Hence Numbers =	700	150	120	30
Increased earnings over a dropout =	\$260	\$356	\$589	\$700
Totals/group	182,000	53,400	70,680	21,000
Sum = 327,080	Divided by original 1000 = \$327 per graduate			

Table 5

Assume 1000 Would-be Female Dropouts
Earnings expressed in 1000s

	700 terminate at high school <u>completion</u>	300 (or 30%) continue to College 50% stay <u>1- 3 yrs.</u>	40% stay <u>4 yrs.</u>	10% stay <u>5 or more yrs.</u>
Hence Numbers =	700	150	120	30
Increased earnings over a dropout =	\$170	\$249	\$312	\$488
Totals/group	119,000	37,350	37,440	14,640
Sum = 208,430	Divided by original 1000 = \$208 per graduate			

Note the hypothetical distribution results in a figure of \$327,000 for males which is only 25.8 percent greater than the original \$260,000 noted for a high school graduate over a dropout. Employing the same distribution on the data for females results in a figure of \$208,000 which is only 22.4 percent greater than the original figure of \$170,000. Both Levin (1972) and Catterall (1985) obviously are assuming a more optimistic continuation rate than noted in this hypothetical distribution. Indeed, it is possible that the hypothetical distribution used herein is overly pessimistic. It assumes for example that only 15 percent of original 1000 actually finish college and that only 3 percent of the original 1000 attend college for 5 years or more (indicating work on an advanced degree).

Nonetheless, we will employ the overly conservative approach and adjust the earnings estimates upward only 25.8 percent for males and 22.4 percent for females rather than use the 36 percent adjustment suggested by Levin (1972) and Catterall (1985). This represents our final adjustment and increases the figures to \$241,630 for men and \$146,072 for women.

In order to partially replicate Catterall's process for projecting lost earnings and taxes, enrollment and attrition figures are required. Catterall used national enrollment figures and estimates of the attrition rates by sex for one grade to estimate the projected losses. We will use a similar approach using the Texas attrition rate estimates reported in Volume 3: Magnitude of the Problem -- Attrition Analysis. The analysis of attrition rates presented in that portion of this overall research effort estimated, on the basis of the size of the ninth grade class in 1982-83 and the twelfth grade class in 1985-86, that 86,000 students were lost. Assuming, as did Catterall (1985), that 52.72% of the dropouts were males and 47.27% were females. The necessary figures and resulting cost estimates are shown in the Table below:

Table 6

PROJECTED TOTAL EARNINGS AND TAX LOSSES TO TEXAS
DUE TO PROJECTED ATTRITION RATES AMONG
1982-83 NINTH GRADERS

Sex	Estimated Number of Dropouts	Individual Lost Earnings (Adj.)	Total Lost Earnings
Male	45,344	\$241,630	\$10.955 billion
Female	40,656	\$146,072	\$5.938 billion
Total gross earnings lost: \$16.893 billion			
Approximate loss of tax revenues assuming all taxes represent 30 percent of income: \$5.068 billion			
Estimated net lost earnings (less taxes):			\$11.825 billion
TOTAL LOST EARNINGS AND TAXES:			\$16.893 billion

Based on these estimates, this group of ninth graders having been allowed to leave school at the rates noted will over time result in a loss in earnings and taxes of approximately 16.89 billion dollars. This represents an average loss in earnings of \$137,504. per dropout and an average loss in taxes of \$58,930. per dropout.

Having generated our estimate of lost wages and taxes let us consider some of the counter arguments that would dispute the validity of such an estimate. First is the argument that having more high school graduates in the job market will simply decrease the income of all graduates as a result of greater competition in the job market. The central premise is that the present job market may not be capable of expanding to allow for suffi-

cient employment of the new sub-group of graduates caused by eradicating the dropout problem. Second is the concern that the independent effects of education as a factor on earnings are not conclusive. Third is the issue of the accuracy of the discount rate being employed. Let us consider each of these arguments in turn.

The argument that more graduates in the job pool will simply deflate the possible earnings of all graduates sounds appealing from a simplistic economic level. However, consider the following points. Numerous writers have discussed the current transition of the United States from a manufacturing to an information processing and service society. The technological base that will form one of the primary cores of this country's economy in the future will not rely on manual labor but on the ability of workers to process information effectively. Thinking skills are increasingly sought after in the job market. If this is not the case, then why is corporate America showing ever increasing concern over the educational skills of its workers? Why do we continue to hear news stories about the educational level of workers in other countries that have demonstrated higher productivity levels in selected industries? Many would argue that the technological growth pattern America is experiencing is logarithmic not linear in nature. And, the students in school today will face a job market that will require a level of skills our school systems are unprepared to deliver. If the economic structure we have experienced in the past were to continue as is well into the future, it might indeed be possible that the new graduates, the other-wise dropouts, might tax the ability of the economy to accommodate them. However, there are a great many experts that feel that preparing for the economy of the future on the basis of the past is a serious mistake. Levin (1970) noted that "as the supply of high school graduates has increased, the incomes of high school graduates relative to elementary graduates or high school dropouts has also increased" (p. 20). Levin went on to state that concomitant with the increased supply of high school and college graduates is an increase in the demand for more highly educated persons. There is also the practical observation that it is doubtful that dropout prevention efforts will eradicate the problem overnight. It is much more likely to assume that effective dropout prevention efforts will gradually erode the problem and therefore allow sufficient time for the job market to adjust.

A second concern that might be raised is that the independent effects of education on earnings has not been sufficiently established to support the projections presented earlier. Although it is true that the exact nature of the relationship between education and income has not been established, Census data are replete with examples of the relationship between these two variables. The data shown in Table 3 demonstrate that a relationship of some magnitude is in effect. As education increases so too does income. One adjustment for possible errors in estimating the magnitude of the relationship between these factors has already been discussed in relation to the "ability factor". As will be noted later, even if one were to deflate the estimated losses in income and taxes by fifty percent to further correct for possible error in the estimation of the actual relationship between income and education, the conclusion of concern here would not be significantly altered. Whether Texans are losing in income and taxes nine times what it might cost to educate dropouts, or four times what it would cost seems relatively inconsequential to the overall conclusion that a serious loss is occurring.

Finally, there is the concern for whether the implicit three percent discount rate utilized herein and in previous studies (Levin, 1970; Catterall, 1985) is appropriate. Recall, that the concept of an implicit discount rate is based on the premise that an annual increase of three percent in productivity balances the negative effects of a three percent discount rate. However, what if the appropriate discount rate is six percent. Anyone who has studied the literature relative to the issue of discount rates will sympathize with

the difficulty in selecting the discount rate. Catterall noted that doubling the discount rate of three percent which he used in his study would cut his reported differences in earnings about in half. Again we return to the question posed earlier: will the problem be of less concern if Texans are losing only 8.4 billion which is half the original estimate of 16.89 billion presented in Table 6. Previous literature in the area notably Levin (1972) and Catterall (1985) felt the three percent discount rate to be appropriate. Hence, we will maintain this estimate of the discount rate in the present study and end this section with the disheartening conclusion that Texans will lose 16.89 billion dollars in wages and taxes from the dropouts in a single graduating class. The reader is left to judge what the cumulative effects of such losses will be and have been over time.

SOCIAL WELFARE COSTS

Levin (1972) considered the social welfare costs associated with inadequate education a critical component in his cost benefit study. His analysis considered only those areas which appeared to hold a relationship with level of education, such as Aid to Families with Dependent Children (AFDC) and Unemployment Compensation. Levin excluded areas such as Old Age Assistance, Aid to the Blind, and Aid to the Disabled. To account for the costs in the area of social welfare, Levin spanned a broad spectrum of research literature. In the final analysis however, Levin was only able to offer educated guesses as to the magnitude of welfare costs associated with the problem of dropouts. Catterall (1985) choose to circumvent the problems encountered by Levin by stating the following regarding Levin's study:

"We note that about half of the presentation in this earlier study, and a majority of it intensive grappling with a wide ranging body of related research, occurs in the author's efforts to provide estimates of these service costs. From the results of their scrutiny, it appears that these costs might be assumed to account for roughly two and a half percent of the overall social costs identified" (p. 15).

Catterall (1985) was referring to the fact that lost wages and taxes were where the majority of social costs were found. Indeed, the area of lost wages and taxes is the primary cost center not only in the studies by Levin (1972) and Catterall (1985) but also in the present research effort. Nonetheless, we will follow Levin's lead and attempt to provide some educated estimates on the costs society incurs in the areas of social welfare as a function of failing to educate a large proportion of the population. The estimation model discussed earlier will be utilized as opposed to the upper lower limit approach of Levin (1972). Two social welfare programs will be considered in this estimate of costs: AFDC and the Food Stamp Program.

It is important to note that we have endeavored to use a conservative approach in estimating costs. While the resultant costs may appear high, note that the possible costs associated with a number of programmatic areas were not considered. For example, in 1985 the Texas Department of Human Services (TDHS) expended nearly \$107 million dollars on protective services for abused and neglected children. It is likely that a small portion of these costs may have been education related. This relationship might be supported by the results of the Biennial Report for 1983-84 of the Texas Department of Human Services on

Family Violence. Although the abuse was not specifically directed to children, this report indicated that 46 percent of shelter center clients and 44 percent of the abusers had not completed high school. If a similar dropout ratio is in effect among the abusers of the children served by TDHS then some portion of the \$107 million should be considered in our cost estimates. However, since data were not retrieved from TDHS on this particular service, no cost was attributed. Likewise, consider the public health care costs associated with lower levels of education. If only 1 percent of the health services costs documented by only TDHS were education related, it would result in the addition of \$7.4 million to our overall estimate of social welfare costs. However, no such education related health care cost estimate was attempted.

Likewise, the substantial costs associated with the provision of mental health services to individuals suffering from severe life stress have not been estimated. As stated earlier, life stress is at times related to a lack of options, and a low level of education does appear to limit one's options. Other areas could be mentioned, but suffice it to say that given what has not been considered, the social welfare costs estimated herein are likely very conservative. We will begin by estimating the AFDC program costs that are possibly associated with inadequate education.

Aid to Families with Dependent Children Costs

A computer report, provided to IDRA in August of 1986, indicated that 123,668 caretakers were being provided assistance through AFDC by the Texas Department of Human Services. Each caretaker on average has two children as dependents. Hence, each caretaker can be roughly considered a case. TDHS provided IDRA with an estimate of costs associated with an average case. These costs included both the direct annual costs associated with working on a case (i.e., \$302.) and the monthly benefits provided each case (i.e., 2,096.88). The average annual cost for each case is therefore \$2,399. as indicated below:

Direct costs per case	
per year -----	\$302.00
Benefits per case per	
month (\$174.74 multiplied	
by twelve months) -----	\$2,096.88
TOTAL = \$2,399./case/year	

Having established an estimate of the annual cost per case, we must consider the number of cases that might have been averted had the dropout population not contributed so heavily to the AFDC user population. To accomplish this, we must have an estimate of the dropout rate among the AFDC population. A study conducted by TDHS staff (Rose & Runte, 1980) indicated that:

"Only 22 percent of AFDC caretakers for whom the level of education is known are high school graduates. Another 29 percent have attended but did not complete high school. The remaining 49 percent have 8 or less years of schooling, with 2 percent having no formal education at all" (p. 15).

Rose & Runte (1980) went on to mention that "there is some indication that the educational level of AFDC mothers may be declining" (p. 17). The data from Rose &

Runte (1980) would appear to indicate that approximately 78 percent of the AFDC caretakers are high school dropouts. To further substantiate the use of 78 percent as our estimate, Levin (1972) cited a 1967 study that indicated that only 20 percent of AFDC mothers were high school graduates. Clearly this latter study is dated but it is interesting to note the similarity between the numbers. We will thus use the estimate of 78 percent in our calculations.

Given that the vast majority of the AFDC caretakers are women, we will use an estimate of the number of females age 20 to 49 in the Texas population as the general population from which the AFDC participants were drawn. We will further estimate based on 1980 Census data that the high school completion rate in this general population is 61 percent.

Table 7

3,063,029 females age 20 to 49

20 to 49 in the General
Texas Population

<u>non-dropouts</u>	<u>dropouts</u>
(61%)	(39%)
1,868,447	1,194,581

AFDC caretaker
population
123,668

<u>non-dropouts</u>	<u>dropouts</u>
(22%)	(78%)
27,207	96,461

AFDC caretakers as a
rate per 100 in the
general population

1.456/100	8.075/100
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Of the 1,194,581 dropouts in the general population, half keep the same rate they had before (i.e., 8.075/100). The other half take on the non-dropout rate (i.e., 1.456/100).

597,290	597,290
same rate 8.075/100	new rate 1.456/100

The resultant
number of
users is

48,231	8,696
--------	-------

Hence 56,927 cases would result rather than 96,461 or
39,534 less cases.

39,534 less cases at \$2,399/per case/year = \$94,842,066.

Before proceeding, let us consider this estimate in comparison to what might have resulted using Levin's (1972) approach of a 50 percent upper and 25 percent lower limit to estimate the cost. Given that AFDC expenditures in 1985 were \$223,378,292. for 116,582 cases, for an average payment of \$1916/case, the anticipated expenditures for this year using 123,668 cases and \$2,096/case might be closer to \$259 million. With this figure Levin might have placed the upper limit at approximately \$129.5 million and the lower

limit at 64.8 million. If we were to choose the midpoint, as he did in his study, the estimated cost would be approximately 97.2 million dollars. The figure we arrived at was approximately 94.8 million or about 2.5 percent lower than what Levin's estimate might have been.

An additional cost area that must be considered separately is the food stamp benefits that are also provided to the AFDC participants. Of the 39,534 AFDC cases that might have been averted (as shown in Table) approximately 90 percent are also receiving assistance through the Food Stamps program at an approximate annual cost of \$2,065.04/case as estimated by TDHS staff. This results in an additional cost of approximately 81.6 million as shown below:

$$39,534 \text{ cases} @ 2,065.04/\text{case} = 81,639,291$$

Before comparing this estimate to what might have resulted using Levin's (1972) approach we will calculate the remaining costs associated with the Food Stamp program that are not related to the AFDC participants.

Food Stamps Program Costs

The TDHS indicated that the monthly average number of food stamp program participants in fiscal year 1985 was 1,287,884. In our discussion of AFDC we have already counted some of the participants in the food stamp program and their associated costs. Since we are assuming that approximately 123,668 caretakers and 247,336 dependents (children) or 371,004 participants have already been counted, then we must conduct our estimates on only the remaining 916,880 participants. We are assuming that the monthly average is a reasonable indicator of the total unduplicated count of Texans served. Note that if the unduplicated count is actually larger the cost estimate model used herein would in all likelihood not be significantly affected.

Since TDHS reported expenditures of \$697,206,226 on what we are assuming was approximately 1.2 million participants, this would indicate costs of about \$541.36/participant. Again, employing our cost estimation model we will use: 1) 39 percent as the proportion of dropouts in the general population; 2) the Texas population age 20 and older as the general population; 3) 59 percent as the proportion of dropouts in the Food Stamp participant population; and 4) 916,880 as the Food Stamp participant population after having excluded those already accounted for in AFDC. The proportion of dropouts in the Food Stamp population was drawn from education data available on a sample of AFDC work registrants. If this proportion is in error it is likely that it is slightly too low given that the work registrants may be those better prepared to obtain employment. Thus, this group may be less representative of the overall group, but again if an error exists it seems logical to assume that the education level is actually lower in the overall group.

Table 8

There are approximately 9,357,309 Texans age 20 and older in the General

<u>Population</u>	<u>non-dropouts</u>	<u>dropouts</u>
	(61%)	(39%)
	5,707,958	3,649,350

Food Stamp Participants excluding AFDC	<u>non-dropouts</u> (42%)	<u>dropouts</u> (58%)
916,880	385,090	531,790

Participants as a rate per 100 in the general population	6.746/100	14.572/100
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Given that there are 3,649,350 dropouts in the general population, we will assume that had they all completed high school only half would have assumed the new rate (i.e., the rate the original non-dropout group has of 6.746/100) of entry to the food stamp program. The other half of the would-be dropouts will keep the same rate they would have had as dropouts (i.e., 14.572/100) despite their graduation. Again this correction is conducted to attempt to adjust for the lack of a clearly defined relationship between education and program participation. Therefore, assuming the 3,649,350 dropouts in the general population had taken on the rates shown below we might expect to see the following numbers:

	1,824,675	1,824,625
	same rate 14.572/100	new rate 6.746/100
Given these assumptions the resultant numbers of users are:	265,892	123,089

Hence 388,981 cases would result rather than the 531,790 (seen in the dropout group) or 142,809 less participants.

142,809 less participants at approximately
\$541.36/per participant = \$ 77,311,080.

Recall that in our discussion of AFDC we attributed approximately 81.6 million as the Food Stamp costs associated with education among this subgroup. In the above analysis we have attributed approximately 77.3 million for the remaining part of the Food Stamp Program (with AFDC participants excluded). All total then we have estimated that 158.9 million dollars in Food Stamp expenditures might have been avoided through the eradication of the dropout problem. As discussed earlier in relation to AFDC, let us consider what the estimate might have been using Levin's (1972) approach. TDHS reported Food Stamp expenditures in 1985 of \$697,206,226. With this figure and using Levin's methodology we would have placed the upper limit at approximately \$348.6 million and the lower limit at 174.3 million. Choosing the midpoint would result in an estimated cost of approximately 261.4 million dollars. The figure we arrived at was approximately 158.9 million or about 39 percent lower than an estimate using Levin's approach.

In conclusion, the possible estimated annual savings in welfare program costs assuming the eradication of the dropout problem is approximately \$94.8 million in relation to AFDC expenditures and \$158.9 million in Food Stamp costs (including the food stamp benefits provided to those on AFDC). Therefore the total cost estimated savings in these two areas is 253.7 million dollars per year.

The final question to be addressed is how long does a person generally need these services. Since the central focus of the benefit cost analysis is to determine what financial benefits might be obtained by preventing a dropout the issue of costs over time is critical. Levin (1972) estimated welfare costs for only one year. But how many of the people that require welfare services actually use the service for only one year? There is literature to support the contention that some may need public assistance for most of their lives. It is possible that Levin, after having concluded that for every dollar spent on education six dollars would be reaped in returns in national income saw little reason to consider the cumulative costs in areas like welfare.

According to sources at the Texas Department of Human Services it is difficult to determine an accurate estimate on the average length of stay in either AFDC or the Food Stamp programs nor how often people return to the programs. Although actual figures on length of stay or recidivism could not be obtained it seems very probable that the individuals using these services require them for more than one year over the course of their lifetime.

Before leaving this section it is important to present one final point. We have in no way considered the cumulative financial, physical and psychological costs to the children represented in these programs. If a situation of poverty could have been avoided through a more complete education for a group of the parents represented in these programs, what would the benefits have been to their children? How many of these children will themselves grow up to also need these services. There is evidence to support the contention that these children have a much higher probability of also needing such services when they grow up. What then is the cumulative cost over time? It is virtually impossible to estimate such cumulative costs but we leave it to the reader to consider how little has actually been accounted for in our estimate of welfare costs attributed to inadequate education.

UNEMPLOYMENT INSURANCE AND EMPLOYMENT PLACEMENT COSTS

In this section we will be considering the possible costs of unemployment insurance and employment placement services that might be attributed to inadequate education. We have already noted that dropouts will earn a great deal less in their lifetime than their non-dropout peers, but will they also have more difficulty finding employment? The primary questions are what will Texans spend on: 1) unemployment benefits for the dropout group that might have been avoided, and 2) helping the dropout group to seek employment through the provision of job placement services? That dropouts have a greater likelihood of being unemployed has already been discussed. National data indicate that the unemployment rate for dropouts in 1984 was 27.7 percent or more than twice the rate for high school graduates not enrolled in college (i.e., 13.4 percent). We would, therefore, expect to see an overrepresentation of dropouts in the group receiving unemployment compensation and job placement services. Each of these areas must be examined as possible sources of costs as a function of inadequate education. To explore these areas, IDRA solicited the cooperation of the staff of the Texas Employment Commission (TEC). The results for each area will be discussed separately.

Unemployment Compensation Costs Related to Inadequate Education

Levin (1972) in estimating the attributable costs of unemployment compensation to inadequate education, set his upper estimate at 25% of total expenditures and his lower es-

timate at 15% of expenditures. Interestingly, these limits were set far lower than those Levin used to estimate crime and welfare costs. Levin gave two reasons why he estimated that the losses in this area would be somewhat lower than noted in the areas of crime and welfare. These reasons were:

1. National economic conditions can cause highly educated people to be unemployed; and
2. The minimum term of employment required for compensation coverage along with the fact that benefit levels are related to previous earnings act to diminish the role of insufficient education. (p. 37)

Note, however, that Levin (1972) still ascribed approximately 20 percent of the cost of unemployment to the problem of inadequate education. In considering the costs related to unemployment, we used the estimation model presented earlier. The key in the model is to examine the effect that the generally higher dropout rate among service users has on costs. The model holds that if there were less dropouts then the lower rate of service use seen in the non-dropout population would prevail and less users would result. As before, we begin by estimating the dropout population in both the users of the service and a comparable general population. Data from the computer records of the Texas Employment Commission indicate that within the group of individuals that received unemployment compensation, approximately 28.7% had less than twelve years of education. As Levin suggested, a critical issue that must be considered is that those individuals who qualify for unemployment must have been recently employed. We will therefore choose as the general population the number of persons in Texas that worked 40 or more weeks in 1979. Clearly the size of the labor force has grown a great deal since 1979. The proportions will do for the purpose of our general cost estimation model since the model is relatively insensitive to the actual size of the general population group in use. If the reader is unconvinced, he or she might try redoing the calculations on the basis of a population size of 5.5 million rather than the 3.5 million to be used in the model. The result in relation to costs will vary less than one tenth of one percent (.01%).

Data from the general population group indicated that 24.5% were not high school graduates. Note, this figure is only slightly lower than that found in the population of those receiving unemployment compensation. This supports the contention by Levin (1972) that the unemployment compensation program is structured in a manner that might diminish the role of inadequate education. Those with very little education experience a higher unemployment rate, and a subset of these experience chronic unemployment. If one has not been employed, one cannot receive unemployment benefits. Nonetheless, let us run our cost estimation model on the figures discussed above. The following table indicates our findings:

Table 9

3,586,633 individuals 18 years or older
in the population of workers employed
40 or more weeks in 1979

	General Population	
	non-dropouts (75.5%)	dropouts (24.5%)
	2,707,907	878,725
Number of Unemployment Insurance applicants based on report for 6/30/86 = 707,772	non-dropouts (71.3%) 504,641	dropouts (28.7%) 203,131
Unemployment Applicants as a rate per 100 in the general population	18.63/100	23.11/100

Of the 878,725 dropouts in the general population, half keep the same rate they had before (ie.23.11/100). The other half take on the non-dropout rate (ie. 18.63/100).

	439,362	439,362
	same rate 23.11/100	new rate 18.63/100
The resultant number of claims is	101,536	81,853

Hence 183,389 claims would result rather than 203,131, or 19,742 less claims. Data from TEC's 1985 annual report indicated that approximately \$616.4 million was paid in benefits to 772,876 claims. This represents an average of \$797 per claim. We will use this average figure to estimate the final attributable cost in this area. The result is shown below: 19,742 less claims at \$797/ claim/year = \$15,734,374.

Our estimate of cost savings in this area, assuming the eradication of the dropout problem, is approximately \$15.7 million. This figure represents approximately 2.5 percent of all the money paid out in unemployment insurance claims in 1985. Recall, that Levin's estimate of ascribed costs in relation to unemployment compensation was approximately 20 percent of benefits.

Costs Related to Job Placement Services

The central premise in this area is that individuals with less skills will have to seek employment placement services from TEC at a slightly higher rate than more educated individuals. Particularly, that dropouts will be slightly overrepresented in the users of TEC's placement services. In addition, it would seem that the less qualified an applicant the more difficult he or she will be to place. Hence, the dropout problem is presumed to: 1) contribute to the occurrence of a slightly greater number of applicants seeking service than would be the case if the dropout problem were eliminated, and 2) contribute to the pool of applicants that will be difficult and costly to place due to their relative lack of education related skills.

We will again employ our cost estimation model to determine how much if any of the costs of employment placement service costs might be attributable to inadequate education. Data from TEC computer records for 1986 indicated that there were approximately 1,591,456 applicants that were provided services. Education data on these applicants further indicated that 31% had not completed high school. Let us again use the general population mentioned earlier in the discussion of unemployment compensation (i.e., the number of persons in Texas that worked 40 or more weeks in 1979). We will choose this as the general population because we assume that it is representative of the group that found and retained employment in that year. The applicant pool is seeking to gain entry into such a population. Recall that the only 24.5% of the general population group had not graduated from high school. Remember also that the actual size of the general population is of relatively little consequence to the final cost estimate to be generated. It only serves as a point of comparison. The real numbers of concern are the different rates of high school completion found between the two populations. Using the numbers discussed to this point the table below depicts the results:

Table 10

3,586,633 individuals 18 years or older
in the population of workers employed
40 or more weeks in 1979

	General Population	
	non-dropouts	dropouts
	(75.5%)	(24.5%)
	2,707,907	878,725
Number of Placement Service applicants based on report for 6/30/86 1,591,456	non-dropouts (71.3%) 1,134,708	dropouts (28.7%) 456,748
Placement Applicants as a rate per 100 in the general population	41.90/100	51.98/100

Of the 878,725 dropouts in the general population, half keep the same rate they had before (i.e., 51.98/100). The other half take on the non-dropout rate (i.e., 41.90/100).

	439,362	439,362
	same rate 51.98/100	new rate 41.90/100
The resultant number of applicants =	228,380	184,093

Hence, 412,473 applicants would result rather than 456,748, or 44,275 less applicants. There were 1.59 million applicants in the total group so this decrease of 44,275 applicants represents a reduction of only 2.78%. TEC's operating budget for the fiscal year that ended August 1985 was \$136,423,521. The liaison in TEC that participated in this study estimated that roughly half of the expenditures, or \$68,211,760, made by TEC went toward the area of placement service provision. Using the results of our cost estimation

model, we will estimate that 2.78% of these expenditures, or \$1,896,286. might have been avoided had the dropout problem not existed.

Conclusions Regarding Employment and Inadequate Education

Having estimated our two primary costs in this area we arrive at the total estimated loss of \$17,630,000 summarized in the table below:

Table 11

Costs of Unemployment Compensation Possibly Related to Inadequate Education	= \$15,734,374.
Costs of Employment Placement Services Possibly Related to Inadequate Education	= \$1,896,286.
TOTAL ESTIMATED COSTS IN THIS AREA	= \$17,630,660.

JOB TRAINING PROGRAMS AND ADULT BASIC EDUCATION COSTS

For many dropouts the lack of an effective education eventually means that they must seek remedial interventions to function within the complexities of today's society. Adult Basic Education and a number of public sector job training programs are designed to respond to this need. Indeed, the need for a better trained workforce has caused private industry to spend millions "educating" many of its employees. To this end, the private sector has begun to take a more active role in supporting the activities of the public schools in hopes of producing a better educated pool of potential workers. If a student drops out of public school and must later be trained either through public or private sector programs a cost has been incurred that might have been avoided. In this section we will briefly consider two such cost areas: 1) the costs associated with the programs funded by the Job Training Partnership Act (JTPA), and 2) the costs associated with Adult Basic Education. Since some argue that in large part these efforts would not be required to the degree that they currently exist if the public school system were producing a better product, we might be tempted to ascribe a large proportion of these expenditures to the dropout problem. However, given the fact that currently anywhere from 20 to 25 percent of Americans are functionally illiterate, eradication of the dropout problem would not make the enormous pool of illiterate Americans disappear. Hence, these services would still be needed for quite some time. However, at least we would not be adding to the pool of persons in need.

Ascribing costs in this area is further complicated by the fact that many participants in such programs receive a Graduate Equivalency Diploma (GED). Hence many record keeping systems do not categorize them as dropouts and rightly so since they did complete their education. Nonetheless, many persons prior to embarking on their GED completion were dropouts. An additional problem is that particularly in the area of Adult Basic Education a large part of the services are provided through community volunteers that are not paid for their time. This process masks a considerable part of the investment society must make in educated people through this medium.

Given these difficulties, we will opt to make some conservative estimates on the savings that might accrue in these areas were the dropout problem to be eradicated. Specifically, ten percent of the expenditures related to JTPA and twenty five percent of Adult Basic Education costs will be ascribed to the problem of dropouts. Since by law twenty-five percent of JTPA expenditures are earmarked for dropouts our ten percent estimate in this area is doubtless conservative. Likewise, given that: 1) a considerable proportion of the individuals seeking Adult Basic Education did not complete high school, and 2) that a substantial amount of volunteer services are provided in Adult Basic Education programs, ascribing only twenty-five percent of their actual dollar expenditures is likely conservative.

JTPA expenditures for fiscal year 1985 were \$88,653,769. Ten percent of this figure is approximately \$8.86 million which is the figure we will use. Expenditures for Adult Basic Education were somewhat difficult to determine given the wide range of reporting styles employed in the Annual Reports to the President by the National Advisory Council on Adult Education. In fiscal year 1979 a figure of \$12,782,388 was reported as the State and Federal expenditures. Based on the trends noted in various reports we estimate the figure for 1986 to be approximately 16 million. Twenty-five percent of this figure or 4 million dollars is the amount we will therefore ascribe to the dropout problem.

CRIME AND PRISON COSTS ASSOCIATED WITH INADEQUATE EDUCATION

As indicated in the early sections of this report, previous research has attempted to estimate the cost of crime associated with inadequate education. Levin (1972) identified a number of cost areas related to crime that he felt could be effectively tied to education and proceeded to estimate the costs using the approach of an upper and lower limit. Levin included areas such as the costs of crimes against persons and property, law enforcement and judicial costs, foregone income of inmates in prison and the private costs associated with crime. Again, he employed an upper limit of 50 percent of costs and a lower limit of 25 percent. In this study, we will consider some similar factors but in most cases apply far more conservative percentages in our estimates. The following four areas will be considered: 1) costs associated with incarceration, 2) the costs of the facilities that serve delinquent youth such as Juvenile Probation and the Texas Youth Commission (TYC), 3) judicial costs and the costs associated with police protection, and 4) a very crude estimate of the cost of crime to victims in the isolated area of stolen property.

Inadequate Education and the Cost of Prisons

The first area to be considered is the possible relationship between inadequate education and the costs associated with incarceration. The central premise in this area is that there exists a subset of individuals incarcerated in Texas prisons who for lack of a more complete education committed crimes, were convicted, and sent to an institution within the Texas Department of Corrections (TDC) system. The phrase convicted and sent to prison is critical in our discussion of the costs of crime associated with inadequate education. National statistics for 1983 reported by the U.S. Department of Justice indicated that on the average, only 20.6 percent of the 11.4 million offenses reported were cleared by an arrest. Note that only a portion of these arrests ever led to a conviction and only a subset of these resulted in incarceration in a State prison. It is also of interest to note that between 1975 (inmate population of 18,151) and 1985 (inmate population of 37,320) the

inmate population reported by the Texas Department of Corrections virtually doubled. In addition, the operating costs of TDC in 1985 (approximately 287 million) were over eight times greater than the operating costs reported in 1975 (approximately 33 million). A preliminary report of a ten year facilities study conducted by the Texas Department of Corrections noted:

"If no actions are taken to reduce the influx of new admissions or the average length of stay, the population will approach 95,000 inmates in 1995" (p. III).

The study went on to note that such an increase in the population and related costs would cause the annual operating figure in 1990 to reach about 614 million and just over one billion in 1995. The projected 1990 costs are approximately double the costs noted in 1985. The reader should keep these projections in mind when considering the cost estimates related to inadequate education to be presented in this report.

That there is some level of relationship between education and incarceration appears to be supported by the disproportionate number of inmates with low levels of educational attainment in comparison to the general population. Again, it is virtually impossible to establish any actual measure of cause and effect between education and incarceration. We can, however, note that if the general dropout population in Texas were to have the same incidence of incarceration as the non-dropout population we would expect to see less people in prison. Keep in mind that our projections relate to costs associated with the possible exclusion from entry of some individuals to the prison system. These individuals are the would-be dropouts that instead graduated and, hence, assumed an incidence rate of incarceration similar to the one in the general non-dropout population. We do not contend that the size of the prison population would by necessity decrease. This is due to the fact that many would argue that the current criminal justice system due to a lack of sufficient facilities both cannot incarcerate all of the criminals that are convicted nor can it afford to incarcerate most criminals for even a third of the time of their actual sentences. If dropout prevention were to deter a large number of people from entering the prison system, it is entirely possible that many of the persons not being sent to prison would simply take their place thus masking the impact of the prevention efforts.

Returning to the issue of estimating incarceration costs associated with a lack of adequate education, we must begin by determining the approximate proportion of dropouts currently in the Texas prison system. An inmate profile generated by the Texas Department of Corrections indicated that eighty percent of the inmates are school dropouts. The Texas Department of Corrections provided IDRA with education data for four types of groups: 1) the total inmate population that had education data although non-verified; 2) the total inmate population that had verified education data; 3) the inmates received in 1985 that had education data although not verified; and 4) the inmates received in 1985 that had verified education data. As noted in the table below, these four groups resulted in a wide range of estimates on the proportion of dropouts in the prison population.

Table 12
Education Data on Prisoners

	Total Active Verified	Total Active Non-Veri	Inmates Recieved 85 Verified	Inmates Recieved 85 Non-Veri
High School or GED	55.0%	31.0%	44.8%	36.6%
GED	11.5%	14.0%	10.0%	15.0%
12 plus	43.5%	17.0%	34.7%	21.6%
less than 12	45.0%	69.0%	55.2%	63.4%
Dropouts includes (GED and less than 12 years of school)	56.5%	83.0%	65.2%	78.0%
	-- average= 80.5% * --			
	-- average= 60.9% ** --			

* This average is for the two non-verified groups only

** This average is for the verified groups only

Note that the estimates range from a possible low of 56.5% dropouts to a high of 83% dropouts. The average between the high and low estimates generated from the non-verified groups is 80.5%. However, the average between the high and low estimates generated from the verified groups is 60.9%. We will use the more conservative estimate represented by the lower average of 61% as our estimate of the number of dropouts in the inmate population.

It is interesting to note that a U.S. Bureau of Justice Statistics reported that approximately 60.8 percent of the inmates in their survey of jails had less than twelve years of education. Another national study, also conducted by the U.S. Bureau of Justice Statistics, examining recidivism noted that approximately 63.0 percent of those entering prison for the first time had less than twelve years of education. Hence, our adoption of a 61% dropout estimate for the Texas prison population is a justifiable, albeit possibly conservative, figure. In order to generate a table in their annual report on rates per hundred thousand of inmates to the general population, the Texas Department of Corrections used a figure of 15,989,000 as the total comparable Texas population. The present study will likewise adopt the total population figure reported by TDC in the cost estimation model.

TDC reported in 1985 an average inmate cost per year of \$7,663.06. (with calculations being based on cash expenditures for maintenance of inmates). The TDC 1985 annual report also indicated that the average length of time served for the total 1985 releases (23,276) was 2 years 0 months and 8 days. Using these data, the table below presents the results of our cost estimation in this area.

Table 13

Estimation of Prison Costs Associated With
Inadequate Education

TOTAL General population =	15,989,000		
TOTAL Prison population =	37,114		
		General Population (15,989,000)	
		non-dropouts	dropouts
		(39%)	(61%)
		6,235,710	9,753,290
Prison Population		non-dropouts	dropouts
Total = 37,411		(61%)	(39%)
rate per 100 =		22,640	14,474
Inmates expressed as a rate per 100		.3631/100	.1484/100

If the dropouts in the general population had the same rate of .1484/100 found in the non-dropout population, then we would expect to see 9254 inmates originate from general population as opposed to the 22,640 that actually occurred.

Hence, there would be approximately 13,386 inmates averted at an average inmate cost per year of \$7,663.06 for an average of 2 years or \$15,326 saved per inmate averted. Multiplying this cost figure out by the projected number of possible averted inmates we arrive at a cost of approximately \$205 million.

$$13,386 * (7663.06 * 2\text{yrs}) = 205,155,440.$$

Let us assume, however, that in at least half the cases, adequate education would in fact not avert the individual from entering the prison system. Such an adjustment would decrease our projected savings in expenditures by 50 percent leaving us with a figure of approximately \$102.6 million. Before finalizing our figure there are a number of other costs we must consider. Primary among these costs is the fact that nearly half of the inmates will be back as indicated by recidivism data. The table below presents data derived from the TDC 1985 Fiscal Year Statistical Report indicating that 43.62% of inmates have had at least one prior confinement in a TDC facility.

Table 14

Prior confinements:

	-----TDC-----		-----Other Prisons-----	
None:	21,042	56.38%	33,071	88.61%
1	9,529	25.53%	3,022	8.10%
2	4,537	12.16%	795	2.13%
3	1,484	3.98%	268	0.72%
4	471	1.26%	97	0.26%
5	173	0.46%	40	0.11%
More 5	84	0.23%	27	0.07%
	37,320		37,320	

Hence, of the 13,386 projected averted inmates, it would be anticipated that about 43.4% would have returned and resulted in an additional expenditure for their second incarceration. Although the table above indicates that over a third of the possible recidivists would return two or more times we will assume only one return. We will further conservatively assume that their second return will constitute a stay of only half their first, or an average of only one year (which in all probability is unlikely as it might be more appropriate to assume that second convictions result in longer sentences and therefore longer stays). These assumptions result in a cost estimate of approximately \$44.5 million as indicated below:

$$5,808 \text{ returns} * (7663.06 * 1 \text{ yr.}) = 44,508,473.$$

However, let us again assume that in at least half the cases, adequate education would in fact not avert the individual's second return as it did not avert his initial entry to the prison system. Such an adjustment would decrease our projected savings in this area of expenditures by 50 percent leaving us with a figure of approximately \$22.2 million.

$$50\% \text{ adjustment leaves } \$22,254,236. \text{ (or } \$22.25 \text{ million)}$$

An additional cost area is associated with the probation supervision that follows virtually 90.8% of all releases, either in the case of mandatory supervision or parole. Mandatory supervision relates to those inmates who committed offenses on or subsequent to August 29, 1977 when Article 42.12 of the Texas Code of Criminal Procedure was amended to require all inmates who are discharged from TDC to be under the supervision of the Board of Pardons and Paroles for the period of time equivalent to the maximum sentence less calendar time actually served on the sentence (p. vii).

Of the 23,333 total releases in 1985, 11,864 or 50.85% were placed on mandatory supervision and 9,328 (39.98%) were placed on parole. In this case let us consider the supervision costs associated with only their first release. We will estimate that the cost of supervision is on average about \$220/year/released inmate. A study by Clear & Cole (1986) indicated that nonfederal probation and parole costs range from \$220 to \$1,700. annually. We have chosen to use the low figure as our estimate of expenditures for such activities in Texas. Even if the actual figure is lower, which would seem doubtful, recall that: 1) we are assuming only one year of supervision, 2) we are dealing with the supervision associated with only their first post incarceration release, and 3) we intend to again deflate our projected cost estimate by 50% (it is highly doubtful that only \$110 total is spent per inmate on post incarceration supervision). These assumptions yield the costs presented below:

Of the 13,386 averted inmates 90.8%
or 12,154 would require post incarceration supervision

$$12,154 * \$220 \text{ total supervision cost/inmate} = \$2,673,987.$$

Adjusting this figure downward by 50% leaves 1.34 million as our estimate of the costs in this area. Summing all the costs we identified in relation to incarceration and education we arrive at a final total of \$131 million that might have been saved on the 13,386 possible averted inmates as shown below:

Initial Incarceration Costs	\$102.60 million
Recidivism Costs	22.25 million
Post Incarceration Supervision Costs	1.34 million
TOTAL	\$126.19 million

Juvenile Probation and the Texas Youth Commission (TYC),

As indicated earlier the services and expenditures of Juvenile Probation and the Texas Youth Commission were explored in detail to determine if a portion of the costs associated with these services might be attributed to the dropout problem. Both Juvenile Probation and Texas Youth Commission staff were highly supportive of this research effort and provided a wealth of computer data on their services. Upon analysis and reflection on this data an estimate of costs was not generated in these two areas for a number of reasons.

First, although research has explored the relationship between delinquency and dropouts the results are far from conclusive. Some argue that delinquency in the school setting often is a precursor to dropping out others argue that the school setting itself contributes to delinquency. Improving education might curtail both the phenomena of dropping out and delinquency. However, it is far from clear what relationship delinquency in isolation has on dropping out.

Another major problem is that many of the children being served by these agencies may eventually drop out, however during the time they are being served they are kept in school through a variety of means. The children that are served at TYC facilities are provided education. In fact, their delinquency may be keeping them in contact with educational services longer than their counterparts that cause no trouble but simply leave school. Hence, the percentage of dropouts among the delinquent vs. non-delinquent group is difficult to ascertain. Without such figures we can not employ the cost estimation model discussed earlier.

Clearly no simplistic explanation of the relationship between dropping out and delinquency would be appropriate. Although intuition might lead us to ascribe some percentage of the costs of these services to inadequate education, we will defer to the lack of a clear relationship and not ascribe any of the costs of these services to the dropout problem.

Judicial Costs and the Costs of Police Protection

In his 1972 national study Levin estimated the cost of crime that might be attributable to inadequate education to be somewhere between 2.0 and 4.1 billion dollars. Using the midpoint between these estimates, Levin arrived at an attributable cost of crime figure of \$3 billion in 1972. In generating these estimates, Levin included: 1) the costs of crimes against persons and property in the areas of homicide, assault and arson (approximately \$1.1 billion), 2) the cost of law enforcement and judicial costs (approximately \$4.2 billion), 3) the private costs of crime (approximately 1.9 billion), and 4) the foregone income of prison inmates (approximately 1.0 billion). All total these categories amounted to 8.2 billion. Using an upper limit for attributable costs of 50% (i.e., 4.1 billion) and a lower limit of 25% (i.e., 2.0 billion) Levin reached his midpoint estimate

of 3 billion. In this section we will consider an estimate of only the law enforcement and judicial costs that may be attributable to inadequate education.

The central premise is that some portion of crime is committed by persons who due to an inadequate educational preparation find themselves in life conditions that contain very limited options. These individuals having exhausted the possibilities of legal means of supporting themselves turn to crime. Some might question how someone can exhaust their legal options of support. Are there not legal jobs for everyone?

According to data compiled by the Texas Employment Commission, the unemployment rate for Texas stood at 7.0 percent in August of 1985 (Texas Employment Commission, Annual Report, 1985). More recent figures indicated that the unemployment rate for March of 1986 had risen from the 1985 figure to 8.4 percent (Texas Employment Commission, 1986). This 1986 percentage represented 673,100 unemployed Texans. Clearly many of these individuals are only temporarily out of work. Nonetheless, there is a large group among them that is chronically unemployed. But what does dropping out have to do with unemployment? National data for 1984 indicated that the unemployment rate for high school graduates not enrolled in college was 13.4 percent (U.S. Bureau of Labor Statistics, 1985). In contrast, the unemployment rate in that same year for school dropouts was a staggering 27.7 percent (U.S. Bureau of Labor Statistics, 1985).

Thus, not only are more dropouts out of work, they also possess less of the educational skills required to get a job. Despite the rhetoric of some, the number of jobs for unskilled labor is decreasing and is expected to continue to decrease. What then is the chronically unemployed dropout to do for financial support? Some might say they will go on welfare. For some females (those with children) there is the possibility of AFDC assistance. Recall from our discussion of welfare costs that the average caretaker (i.e., the average case includes one caretaker and two children) will be provided less than \$4,000 per year in AFDC and Food Stamp benefits to support the family. For single males, the situation is even more interesting to consider. Outside of the Food Stamp program (which appears to provide a yearly average of less than \$700 per participant), what other types of program support are they eligible to receive? We could identify no other public welfare programs that would provide significant financial support to this group. We are not asserting that being poor and possessing few if any perceptible options constitute a justification for the commission of crime. We are simply asking the reader to consider the viability that there may be a relationship between inadequate education and crime.

Returning to the central question at hand, what proportion of the costs of crime can we reasonably attribute to problem of inadequate education? As indicated earlier, Levin (1972) identified some key areas of crime that might be linked to inadequate education and then applied an upper estimate of 50 percent and a lower limit of 25 percent to the costs in these areas. In this section we will consider only the judicial and law enforcement costs that may result from the crime attributable to inadequate education. To insure that our estimates in this area are conservative we will split the lower limit employed by Levin (1972) in his study (i.e., 25%) in half. Recall, that Levin finally adopted the midpoint between his upper and lower limits which resulted in attributing roughly one third of the costs of crime that he had identified to the problem of inadequate education. By using a proportion of 12.5 percent we will be employing an estimate approximately one third the size of that used by Levin in his 1972 study.

The State of Texas Judicial costs in fiscal year 1985 were \$47,054,964 (McGarrell & Flanagan, 1984). Employing our figure of 12.5% attributable to inadequate education we

arrive at a cost estimate of \$5,881,870.. Note that we have only considered the judicial costs the State government incurred in 1985. There is also the question of local judicial costs which are far greater than those incurred by the State government. However, keeping with our conservative approach we will not include a percentage of the local judicial costs.

The next area we must consider is the necessary costs of police protection related to crime that might be attributable to inadequate education in the population. The State and Local governments in Texas spent approximately \$929 million on police protection in 1983 (U.S. Bureau of the Census, Governmental Finances, 1983). The figure will doubtless exceed a billion dollars in 1986. Nonetheless, we will use the 1983 figure for our estimate. As discussed earlier, we are attributing 12.5% of the required cost of police protection to crimes associated with inadequate education. Therefore, we estimate that \$116.1 million might have been saved in the area of police protection through the eradication of the dropout problem. Combining our estimates of possible savings in judicial and police protection costs, we arrive at an overall estimate of approximately \$122 million.

Cost to the Victims of Crimes Related to Inadequate Education

This particular section is somewhat mislabeled in that we will in no way be considering the overall costs to the victims of crimes associated with inadequate education. To generate such an estimate would require an enormous research effort and in the end it is doubtful the total actual costs could ever be quantified. Instead, this section will endeavor to impress upon the reader two points of interest: 1) that this overall research effort has not addressed the total costs that the crimes associated with inadequate education inflicted on the victims, and 2) that even when considering only the isolated area of property loss the costs are enormous.

In surveying the annual reports of a number of urban police departments in Texas, it was found that very few report the dollar amounts in lost and recovered property. However, some do and they might serve as a base for an estimate. For example, the 1985 annual report of the Dallas Police Department indicated that accounting for the areas of burglary, robbery, larceny and auto theft, approximately \$151.4 million of property was stolen in 1985. Of this property approximately \$52.5 million was recovered yielding a final stolen property loss of approximately \$98.9 million for the year. Since there are estimated to be 987,350 people in the area served by the Dallas Police Department, this represents a loss in stolen property of nearly \$100./per person. Let us assume that possibly the loss per capita in this particular community is slightly higher than what might be found across the State (although we do not have evidence to support this contention). Therefore, we will conservatively deflate the \$100/per capita figure by 33% and instead use the cost estimate of \$66/per capita in losses due to stolen property. Assuming there are approximately 14.5 million people in Texas our cost estimate for the entire State would be nearly a billion dollars in losses in stolen property as shown below:

14.5 million
Texans

A per capita loss of \$66. in
x stolen property results in an
net loss of = \$957,000,000.

Again using our estimate of a possible 12.5% of crime attributable to inadequate education, the cost in this area is approximately \$119.6 million.

Conclusions Regarding the Costs of Crime and Prison Associated With Inadequate Education

In the above sections we have presented estimates of the attributable costs related to inadequate education for each of the following three major cost areas (recall that a cost was not defined for juvenile facilities): 1) costs associated with incarceration, 2) judicial costs and the costs associated with police protection, and 3) a very crude estimate of the cost of crime to victims in the isolated area of stolen property. Let us proceed then to sum our estimates to derive the total cost in this area to the people of Texas. Table 15 summarizes the costs and indicates that the total represents a loss of approximately \$367.77 million.

Table 15
**SUMMARY OF COSTS ATTRIBUTED TO INADEQUATE EDUCATION
IN AREAS RELATED TO CRIME AND PRISONS**

Cost Areas:		
Prisons (TDC)	Cost Estimate	
Initial Incarceration	\$102.60 million	
Recidivism	22.25 million	
Post Incarceration Supervision	1.34 million	
Prison Total =		\$126.19 million
Judicial Costs	5.88 million	
Police Protection Costs	\$116.10 million	
Judicial & Police Protection Total =		\$121.98 million
Estimate of Total Losses in Stolen Property from Crimes related to Inadequate Education =		\$119.60 million
TOTAL FOR THESE AREAS =		\$367.77 million

THE COST OF EDUCATING DROPOUTS

Estimating costs resulting from the dropout problem must be put in perspective in relation to the costs Texans will bear in educating this group. The costs in the following three areas will be considered. The cost of: 1) completing their high school education, 2) college for that percentage that will go on beyond high school, and 3) providing effective dropout prevention programs. Unlike previous sections of this report wherein we have tried to take a conservative view of costs, in this particular area we will endeavor to insure that any errors in our final estimate are in the direction of over estimation.

The first area we must consider is how much it would cost to complete the education of a would-be dropout. Clearly, such a cost would span a number of years. Since dropouts leave at different points in the education process, it is difficult to know how many additional years of education they required. Those that left in the eleventh grade only needed one more year. However, some may have needed as many as five or six years (i.e., those that left in grade seven or six). Let us consider some hypothetical distributions to help us arrive at an educated estimate of the number of additional years that would have been required. Two such hypothetical distributions are shown below each assuming a population of 100 dropouts (the choice of 100 is simply for the sake of numerical convenience):

Table 16

Assuming 100 dropouts

Distribution 1				Distribution 2			
Total	Number				Number		Total
Years	of Years				of Years		Years
	Required				Required		
60	6	10%	left at grade 6	10%	6		60
75	5	15%	left at grade 7	15%	5		75
80	4	20%	left at grade 8	25%	4		100
75	3	25%	left at grade 9	25%	3		75
30	2	15%	left at grade 10	15%	2		30
10	1	10%	left at grade 11	5%	1		5
2.5	.5	5%	left at grade 12	5%	.5		2.5
mean = 3.32		100%		100%		mean = 3.47	

Note from the table above that distribution two assumes that 75% of the dropouts will have left at or before the ninth grade. It must be noted that it is very probable that this is an overestimation and therefore our estimate of 3.5 additional years required is high. Nonetheless, adopting distribution two means the average dropout would require approximately 3.5 additional years to complete their high school education. This then will be the figure we use in generating cost estimates. What is now required is an estimate of the yearly costs per student associated with public school education in Texas. Based on the September 1986 findings of the Accountable Costs Advisory Committee of the Texas State Board of Education, the yearly per student cost in 1987-88 will be \$2,715. The committee also projected that the 1988-89 costs will increase by slightly over 8.7 percent to \$2952 per student per year. Since we need an estimate for a period of 3.5 years we will adopt the 8 percent per year increase as noted below:

1987-88	1988-89	1989-90	1990-91
\$2,715.	\$2,952.	\$3,210.	\$3,490.

We will use only one-half of the 1990-91 figure, or \$1,745, since our estimate is only for a 3.5 year span. Adding up the costs over the 3.5 years we arrive at a total of \$10,622. Recall that the attrition study estimated the number of dropouts from the graduating class of 1985-86 to be 86,000. Using this figure we arrive at an education cost of \$913.5 million as shown below:

86,000 dropouts x a cost of \$10,622/dropout = \$913,492,000.

The second cost area we must consider is that some of these averted dropouts might continue their education beyond the high school level. The figures that Levin (1972) reported indicate he estimated that these additional years of schooling in college would cost roughly double the annual amount for public school education per year.

	<u>1991-92</u>	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>1995-96</u>
Public School	\$3,490.	\$3,795.	\$4,126.	\$4,486.	\$4,878
College	\$6,980.	\$7,590.	\$8,252.	\$8,972.	\$9,756

In the section on income, we assumed that of the averted dropouts: 1) 15% would go on for one to three years of college, 2) 12% would complete four years of college, and 3) 3% would attend college for 5 or more years. For the first group, the 15 percent that might attend for one to three years, we will use an average of two and simply take the projected college cost figure for 1992-93 of \$7,590. times two (i.e., \$15,180.). For the 12 percent that might attend for four years we will simply sum the college figures for 1991-92 through 1994-95 (i.e., \$31,794.) Finally, for the 3 percent that might attend for five or more years, we will simply sum the figures for years 1991-92 through 1994-95 and then add two times the figure for 1995-96 (i.e., \$51,306.). Using our estimate of 86,000 dropouts that might be averted, the resultant cost estimates for a portion of the group continuing on to college are shown below:

Table 17

Original group is 86,000

	Number in Group	Estimated College Cost	Total Cost
70% terminate after high school graduation	60,200	- 0 -	- 0 -
15% continue to college for average of 2 yrs	12,900	\$15,180.	\$195.8 million
12% complete four years of college	10,320	\$31,794.	\$328.1 million
3% attend college for five of more yrs.	2,580	\$51,306.	\$132.4 million
		TOTAL =	\$656.3 million

Given the high cost of college, this estimate indicates that the years of schooling some might participate in after high school will cost approximately 72 percent as much as the total cost for total averted dropout group's public school education.

The final cost that must be estimated is associated with the expenditures required to implement the dropout prevention efforts that would cause the 86,000 dropouts to be averted and instead complete their education. Since there are few models that can be cited and even fewer for which estimates of annual costs per student are available, we will

simply have to offer an educated guess.

There exists research that would indicate that potential dropouts can be identified with some degree of accuracy. Hence, the programs developed could probably be targeted to subgroups in the overall student population. Since we estimated earlier that approximately 33 percent of a graduating class will dropout over the course of high school, we might for example target dropout prevention on only half of the total students in a graduating class. The issue is that we must determine a prevention cost but should it be based on a per dropout or a per student basis? Let us assume, despite the research to the contrary, that districts might have a difficult time identifying who might or might not dropout. Hence, their efforts would need to address at least 50% of the students in a given graduating class. There was approximately a quarter of a million students in the ninth grade in 1982-83 which were later to be the graduating class of 1985-86. Hence, let us take half this figure, or 125,000 as the number of students that were targeted for dropout prevention. Let us further assume that the prevention efforts must be applied for the entire duration of the average 3.5 years we estimated earlier of additional schooling required by the potential dropouts. Finally, let us estimate that prevention efforts will add as much as 25 percent per targeted student to the overall estimated costs of public school education. Clearly this is an overrepresentation of the costs for a number reasons. First, it is doubtful that effective prevention efforts would need to take such a "shotgun approach" that half of all the students in a graduating class would be targeted and served. Second, effective prevention efforts might deter the potential dropout within a much shorter time period than the estimate of 3.5 years used herein. However, since our primary interest in the benefit-cost analysis is to compare the benefits that might be reaped from investing in education and dropout prevention, let us pursue the overestimation in this area. Using the figures we reported earlier as estimates of the annual costs per student in Texas schools let us calculate the costs of an additional 25 percent over a 3.5 year period. The resultant numbers are shown below:

	1987-88	1988-89	1989-90	1990-91
	\$2,715.	\$2,952.	\$3,210.	\$3,490.
				(\$873.)*
25% =	\$679	\$738.	\$802.	\$436.

* Note we used half the cost for 1990-91 to generate the total.

The total for the 3.5 years of prevention sums to: \$2,655. per student.

If we multiply this cost by the 125,000 students in the overall prevention target group the resultant cost is \$331.9 million. Since we estimate that we are trying to avert approximately 86,000 dropouts the figures for prevention efforts indicated above represent an average cost of \$3,859 per dropout.

Based upon our analysis of each of the three primary cost areas we can proceed to generate our overall education and prevention cost estimate. The figures below indicate that the total cost in this overall area is approximately 1.90 billion dollars.

Summary of Cost Estimates
The Cost of Education

Cost of completing
high school education -----\$913.5 million

Cost of providing dropout
prevention programs -----\$331.9 million

Cost of college for
that percentage that
continue beyond high school -----\$656.3 million

TOTAL EDUCATION & PREVENTION COSTS ----- \$1,901.7 million

BENEFIT COST ANALYSIS CONCLUSIONS

Having completed our estimates on the benefits and costs in each of the major areas let us take stock of what we have learned. The benefits are expressed in terms of: 1) the savings in expenditures in relation to welfare, crime, incarceration, unemployment insurance payments and employment services that might result from the eradication of the dropout problem; and 2) the potential gains in earnings and taxes resulting from dropouts having a higher earning potential if they become high school graduates. The costs relate to the expenditures that would be required to: 1) complete their high school education; 2) pay for the years in college that some might go on to after graduation high school; and 3) implement dropout prevention efforts. The table below summarizes the totals reported for each of the major areas.

TABLE 18
SUMMARY OF COSTS AND BENEFITS

BENEFIT CATEGORIES

I. Possible savings related to:

Welfare Costs

AFDC Costs ----- 94.80 million

Food Stamps ----- 158.90 million

Category Total ----- \$253.7 million

Training and Adult Education Costs

Adult Education ----- 4.00 million

JTPA ----- 8.86 million

Category Total ----- \$12.9 million

Crime and Incarceration Costs

Incarceration

& Post Supervision -- 126.19 million

Judicial Costs ----- 5.88 million

Police Protection --- 116.10 million

Property Loss ----- 119.60 million

Category Total ----- \$367.77 million

Unemployment Insurance & Placement Services

Unemployment Ins. --- 15.73 million

Placement Services -- 1.90 million

Category Total ----- \$17.63 million

TOTAL POSSIBLE SAVINGS IN RELATION

TO SOCIAL EXPENDITURES IN THESE AREAS ---- \$652.00 million

II. Possible increase in wages and taxes

Gross Earnings:

Male Dropouts ----- 10.955 billion

Female Dropouts ---- 5.938 billion

Total ---- 16.893 billion

Minus Tax Revenues ----- 5.068 billion

Net Earnings Loss ----- 11.825 billion

TOTAL LOST EARNINGS AND TAX REVENUES ----- \$16.893 billion

TOTAL BENEFIT CATEGORIES I & II ----- \$17.545 billion

COST CATEGORIES

Education & Prevention Costs

Cost of completing

high school ----- 913.50 million

Cost of providing

dropout prevention

programs ----- 331.90 million

Cost of College for

that group that continues

beyond high school - 656.30 million

TOTAL EDUCATION & PREVENTION COSTS ---- \$1.90 billion

The benefit categories sum to approximately \$17.5 billion. The cost categories sum to approximately \$1.90 billion. *In essence, for every dollar expended on prevention and the education of the would-be dropout, nine dollars will be returned.* Note also that the estimated losses in social expenditures related to welfare, crime, incarceration and unemployment, alone amounted to \$652 million. This is not far from the amount we estimate it will cost to complete the high school education (\$913.5 million) of all of the 86,000 dropouts we estimated in this study. The question then is: Where do Texans wish to spend limited resources? On the basis of the staggering amount being lost in earnings and tax revenues (i.e., \$16.89 billion), it seems the choice would be obvious. Indeed, it is interesting to consider how long it would take before dropout education and prevention is funded totally by the increased revenues gained by diminishing the dropout problem.

Consider that the 86,000 students lost in the graduating class of 1985-86 will result in a potential tax loss of \$5.07 billion over the next forty-five years. Keep in mind also that the students that will be lost in the class of 1986-87 will likewise result in a loss in tax revenues of approximately \$5.07 billion over the course of their forty-five years in the labor force. And the pattern continues. Given the extraordinary amount being lost in taxes for each graduating class (\$5.07 billion), it would not be long before the \$332 million we estimated might be required for the prevention efforts could be funded totally from the increased tax revenues paid by the averted dropouts.

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